DATA TRANSMITTING METHOD, DATA TRANSMITTING SYSTEM,
DATA RECEIVING METHOD AND RECEIVING TERMINAL

BACKGROUND OF THE INVENTION

FIELD OF THE INVENTION

The present invention relates to a data transmitting method, a data transmitting system, a data receiving method and a receiving terminal, and more particularly, is suitably applied to a digital satellite broadcasting system.

DESCRIPTION OF THE RELATED ART

In the digital satellite broadcasting system, a broadcasting service using a communication satellite (CS) (hereinafter, this is referred to as CS broadcasting) provides user programs on hundreds of channels. Moreover, in recent years, in the CS broadcasting of the digital satellite broadcasting system, a data broadcasting service has been provided, so that the users can receive the data broadcasting via a receiving board for data broadcasting.

As shown in Fig. 1, in a digital satellite broadcasting system 80, a broadcast wave transmitted from the antenna 81 of a broadcasting station is distributed via a communication satellite 82, received by an integrated receiver decoder (IRD) and a receiving board for data broadcasting (not shown in Fig.) via each antenna 83A to 85A. This received data is transmitted to each

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client personal computer (hereinafter, these are referred to as a client PC) 83 to 85 as a data broadcast signal. This is *known as* ~~so-called~~ one-to-many broadcasting service that means there are many unspecified clients as receivers with respect to one broadcasting station as a sender.

Such a digital satellite broadcasting system 80 *provides* ~~gives~~ the one-to-many broadcasting service, so *that data is not* ~~data could not be~~ transmitted only to specified client PCs 83 to 85 from the broadcasting station.

On the other hand, in an information transmitting system using an open-network on Internet, when a client requests a server for transferring, for example, a homepage through a terrestrial circuit and Internet, the server reads the desired homepage from a prescribed database, and transmits this to the client through the *same* terrestrial circuit ~~the same~~ as that used when the request was made.

In such an information transmitting system using Internet, the amount of transmittable data is limited depending on a transmission rate of a telephone line that connects the server to the clients, and *the* ~~a~~ traffic (data traffic). This is because it takes a long time to transmit a homepage including picture data, which has a large amount of information, from the server to the client.

To obviate such defects, in recent years, a new information transmitting system (hereinafter, this is referred to as satellite

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Internet system) called satellite Internet has been provided, in which a mass of data such as a homepage including picture data is distributed from a server to a client in a short time via a communication satellite for CS broadcasting.

In a satellite Internet system 90, as shown in Fig. 2 in which the same reference numerals are added to corresponding parts in Fig. 1, when a client PC 83 as a receiver requests an Internet provider (hereinafter, this is simply referred to as a provider) as a sender for transferring a desired homepage, through a public circuit 86, the sender transmits the video data of the specified homepage on an Internet 88 via an antenna 81 and a communication satellite 82, and the receiver receives the data with an IRD and a receiving board only for satellite Internet (not shown) via an antenna 83A to transmit this to the client PC 83.

This satellite Internet system 90 uses the terrestrial public circuit 86 as an up-circuit from the client PC 83, and uses a satellite circuit capable of transmitting a mass of data at a high speed as a down-circuit. Thereby, a mass of data such as a homepage including picture data can be transmitted to the client PC 83 in a short time.

Here, the satellite Internet system 90 utilizes a transmission control protocol/Internet protocol (TCP/IP) in the Internet. When ~~And the satellite Internet system 90, when~~ a receiving board only for satellite Internet that is to receive data such as a homepage transmitted from the communication satellite 82 is

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installed in the IRD with *the satellite Internet system 90* plug-and-play, recognizes the receiving

board as a device for the network.

That is, each receiving board only for satellite Internet

has a unique MAC address *(media access control)*. The provider 87 as a sender can transmit

data to the client PC 83 as a receiver via the receiving board

only for satellite Internet with an IP address *when the* ~~and the media~~

~~access control~~ *is* {MAC} address added to the header of an Internet

protocol (IP) packet.

Here, the IP address is a unique address which is composed

of a network address and a host address in a network layer of the

time when an IP packet is transmitted and received. ~~And the~~ *the* MAC

address is a unique physical address which is used to identify a

terminal connected to a local area network (LAN). That is, the IP

packet is transmitted to a specified client based on both ~~of~~ the

IP address and the MAC address.

Then, it is considered that if the digital satellite

broadcasting system 80 can utilize the communication system of the

satellite Internet system 90 which realizes a one-to-one

intercommunication, the one-to-one intercommunication can be

realized also in the digital satellite broadcasting system 80.

However, *since* ~~such~~ a digital satellite broadcasting system 80

provides a one-to-many broadcasting service, it is necessary to

assign a unique MAC address to each receiving board for data

broadcasting to transmit data from a broadcasting station only to

specified clients PCs 83 to 85.

In the digital satellite broadcasting system 80, however, the data broadcasting service using the CS broadcasting has already been *implemented* ~~started~~. Thus, it has been practically difficult to load later read only memories (ROMs) each storing a MAC address, in the receiving boards for data broadcasting that many users already have, because *a* ~~the~~ recall of the receiving boards for data broadcasting is needed.

SUMMARY OF THE INVENTION

In view of the foregoing, an object of this invention is to provide a data transmitting method, a data transmitting system, a data receiving method and a receiving terminal which are capable of assigning unique terminal information to a receiving terminal ~~means~~ and transmitting specified data only to *a* specified receiving terminal ~~means~~.

The foregoing object and other objects of the invention have been achieved by the provision of a data transmitting method and a data transmitting system. In the case of transmitting data from a transmission *apparatus* ~~means~~ to a receiving terminal ~~means~~, unique terminal information to specify and identify one of plural receiving terminals ~~means~~ as a destination of transmission and an update program to change processing of the receiving terminal ~~means~~ are transmitted from the transmission *apparatus* ~~means~~ to the receiving terminal ~~means~~, the unique terminal information and the update program are received by the receiving terminal ~~means~~ and the unique terminal

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information and the update program are stored in a prescribed

storage ~~means~~ [unit] to update the processing.

Since the unique terminal information is assigned to the

receiving terminal ~~means~~ and the processing of the receiving

terminal ~~means~~ is updated by the update program, a transfer

request generated based on the update program is transmitted to

the transmission ~~means~~ [apparatus] along with the unique terminal information [, desired data]. [In]

~~and desired data in~~ response to the transfer request, [desired data] can be

transmitted only to [a] specified receiving terminal ~~means~~ from the

transmission ~~means~~ [apparatus] based on the unique terminal information.

Therefore, a data transmitting method and a data transmitting

system can be realized, which is capable of assigning unique

terminal information to a receiving terminal ~~means~~ and of

transmitting prescribed data to only [a] specified receiving terminal

~~means~~.

Furthermore, the present invention provides a receiving

terminal for receiving data transmitted from a transmission ~~means~~ [apparatus].

The receiving terminal comprises a [receiver operable to receive] ~~receiving means for receiving~~

unique terminal information to specify and identify one of plural

receiving terminals as a destination of [the] transmission and an update

program to change processing of the receiving terminal ~~that were~~

sent from the [receiver] ~~receiving means~~, and a storage [unit operable to store] ~~means for storing~~ the

unique terminal information and the update program received by the

above [receiver] ~~receiving means~~.

Since the unique terminal information is assigned to the

receiving terminal and the processing of the receiving terminal

is updated by the update program, a transfer request generated

based on the update program is transmitted to the transmission

means along with the unique terminal information, and desired
apparatus
~~data~~ corresponding to the transfer request which is transmitted
                               apparatus
from the transmission ~~means~~ based on the unique terminal

information can be received by the receiving terminal.
                    a
Therefore, ~~the~~ receiving terminal can be realized, which is

capable of receiving desired data corresponding to a transfer

request.

The nature, principle and utility of the invention will

become more apparent from the following detailed description

when read in conjunction with the accompanying drawings in which

like parts are designated by like reference numerals or

characters.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings:

Fig. 1 is a schematic diagram showing the configuration of

a digital satellite broadcasting system;

Fig. 2 is a schematic diagram showing the configuration of

a satellite Internet system;

Fig. 3 is a schematic block diagram showing the

configuration of an satellite Internet system of this

embodiment;

Fig. 4 is a block diagram showing the configuration of a

receiving terminal; and

Fig. 5 is a schematic diagram showing a procedure for

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downloading software and a MAC address sent from a provider, to a receiving board.

DETAILED DESCRIPTION OF THE EMBODIMENT

Preferred embodiments of this invention will be described with reference to the accompanying drawings:

Referring to Fig. 3, 1 generally shows a satellite Internet system as a data transmitting system according to the present invention. When a user uses a normal digital satellite broadcasting service, a digital broadcast signal transmitted from a communication satellite 9 is received by an integrated receiver decoder (IRD) 8 via the antenna 10 of a receiving terminal 2 ~~as a receiving terminal means~~.

As shown in Fig. 4, the IRD 8 controls a front end 13, a demultiplexer 14, a motion picture expert group (MPEG) 2 audio decoder 15 and an MPEG2 video decoder 16 with a central processing unit (CPU) 11 that is connected to a memory 12 being a random access memory (RAM) storing a prescribed processing program. The IRD 8 transmits a digital broadcast signal S10 received via the antenna 10 to the front end 13.

The front end 13 performs quadrature phase shift keying (QPSK) demodulation processing on the digital broadcast signal S10, and then performs data error correction processing on the demodulated signal to extract a transport stream S11, and transmits this to the demultiplexer 14.

The demultiplexer 14 separates the extracted transport stream S11 *picks* ~~and picking~~ out the program data of a contracted channel, and transmits an audio stream S12 comprised of packets of the audio part of the above program data to the MPEG2 audio decoder 15 and at the same time, it transmits a video stream S13 comprised of the packets of the video part to the MPEG2 video decoder 16.

The MPEG2 audio decoder 15 returns the audio data before compression-coding by decoding the audio stream S12, converts this into an analog signal to generate an audio signal S14, and outputs this as a program's sound from a speaker of a monitor (not shown) in the following stage.

The MPEG2 video decoder 16 returns the video data before compression-coding by decoding the video stream S13, converts this into an analog signal to generate a video signal S15, and outputs this as a program's image to the monitor (not shown) in the following stage.

Hereinafter, the processing in the satellite Internet system 1 (Fig. 3) when a user uses a satellite Internet service will be described with reference to Figs. 4 and 5.

First, in a client personal computer (PC) 3, as a first step, a CPU 25 reads out a client's name unique to the client PC 3 or equipment information unique to a receiving board 7 from a main memory 27 through a host bus 24 as recognition data, and transmits this to a terminal adopter (TA) 30 via a peripheral component

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interconnect (PCU-PCI) bridge 23 and a serial port 29.

The TA 30 performs prescribed modulation processing on the identification data, and then transmits the modulated data to a provider 6 ~~as a~~ *via the* transmission ~~means~~ *apparatus* through a terrestrial circuit 4 such as an integrated services digital network (ISDN), and an Internet 5 (1).

As a second step, the provider 6 refers to a customer management database (not shown) based on the recognition data. If the recognition data has been registered in the above customer. management database, it obtains an ~~authentication, and otherwise~~ *· If the recognition data is not registered* it cannot obtain the authentication. That is, when the authentication cannot be obtained based on the recognition data, the provider 6 finishes the processing since the authentication ended in failure (2).

If the authentication can be obtained, as a third step, the provider 6 assigns one of plural MAC addresses that have been previously prepared so as to be able to assign to all shipped receiving boards 7 respectively as unique terminal information, and then, encodes the MAC address being e.g. "00:11:22:33:44:01" by a prescribed coding system to generate a key ID "1234567890" as converted unique information.

Here, the MAC address is a unique address in the world, and also the key ID generated based on the above MAC address is unique data; the receiving boards 7 have their own addresses and data different from each other. Furthermore, redundant data is added to

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the key ID to prevent easy falsification by a user.

Then, the provider 6 returns the software for a receiving board as an update program needed to start the one-to-one data communication service with the client PC 3 via the communication satellite 9, the download application needed to download the above software for a receiving board in the receiving board 7 and the aforementioned key ID, back to the client PC 3 acting as a receiver through the Internet 5 and the terrestrial circuit 4 as installed data (3).

Here, with respect to the software for a receiving board and the download application, compressed data are transmitted to the client PC 3 without change. In this connection, the software for a receiving board and the download application are common data to all of the receiving boards 7. Therefore, for the provider 6, it is unnecessary to prepare different software for a receiving board and download application for each receiving board 7.

As a fourth step, the client PC 3 receives the installed data returned back from the provider 6 via the TA 30, and temporarily writes this in the main memory 27 via the serial port 29, CPU-PCI bridge 23 and a host bus 24.

Then, the client PC 3 reads out the download application in the installed data temporarily written in the main memory 27 under the control of the CPU 25 while performing data extension, and controls a video graphics array (VGA) controller 31 based on the above download application to give the user a notice by displaying

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the assigned key ID on the display of a monitor 32 and then

displays an input screen corresponding to the download application.

Then, in the client PC 3 the key ID is inputted in a dialog box on

the input screen of the monitor 32 by the user (4).

As a fifth step, the client PC 3 divides into blocks the

data of key ID entered by the user with the CPU 25, and further

checks the sum of data in each block, by performing a

check sum step to judge whether it is a legal key ID or not.

Here, if the legality of the key ID is determined by the CPU

25, the client PC 3 reads out the software for a receiving board

which is common to all of the receiving boards 7 while performing

data extension from the main memory 27 and stores it in a

prescribed area (shown by diagonal lines in Fig. 5) in a hard disk

drive (HDD) 26. At the same time, the client PC 3 reads out the

key ID from the main memory 27 and stores this in another area

(shown in blank in Fig. 5) that is different from the software for

a receiving board, and then transfers the software for a receiving

board to the receiving board 7.

Here, the client PC 3 performs data extension on the

software for a receiving board only when the key ID is legal, and

until that time the data-compressed software is stored in the main

memory 2 as it is, so that analysis or falsification of the

software for a receiving board by the user can be prevented.

The receiving board 7 writes in the software for a receiving

board transferred from the client PC 3 to a specified area (shown

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by diagonal lines in Fig. 5) of a flash memory 19 acting as a storage means via a PCI bus interface 21 and a data processor 20, to update the software so as to correspond to a data communication service (5).

As a sixth step, the client PC 3 returns the original MAC address by reading out the key ID from the HDD 26 and decoding it under the control of the CPU 25, and transfers this to the receiving board 7. Here, since the MAC address had been stored in the HDD 26 in a state in which it is converted into the key ID, the key ID is not recognized by the user that the key ID is MAC address. Thus, falsification by the user can be prevented.

The receiving board 7 writes in the MAC address transferred from the client PC 3 to another area of the flash memory 19 different from the prescribed area in which the software for a receiving board has been written, under the control of the CPU 18, and finishes ~~download to the receiving board 7 of the MAC address (6).~~

Since the client PC 3 finished the download of the software for a receiving board and the MAC address to the flash memory 19 of the receiving board 7, as a seventh step, it deletes the software for a receiving board and the key ID written in the main memory 27 and the HDD 26. Thus, falsification of the software for a receiving board by the user can be prevented.

As a result, when receiving a transfer request of service information desired by the user (e.g., world wide web (www)

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browser or the like) from the client PC 3, the provider 6 (Fig. 3)
reads out e.g., the homepage corresponding to the transfer request
from a server (not shown), and adds this to a data part of an IP
(Internet protocol) packet. And at the same time, the provider 6
adds the MAC address and the IP address sent along with the
transfer request to the header part, and generating the IP packet.

Furthermore, the provider 6 divides the IP packet into
plural TS packets, and then multiplexes the TS packet to generate
a transport stream, and transmits this from an antenna 6A via the
communication satellite 9 as a digital broadcast signal.

The IRD 8 (Fig. 4) transmits a digital broadcast signal S10
received via the antenna 10, to the front end 13. The front end 13
performs the QPSK demodulation processing and error correction
processing on the digital broadcast signal S10, and then extracts
a transport stream S11, and transmits this to a demultiplexer 17
in the receiving board 7 via a high speed output port (not shown).

The demultiplexer 17 separates the transport stream S11 to
convert it into plural transport stream (TS) packets, and
transmits these to the data processor 20. The data processor 20
generates section data in section format by collecting plural TS
packets, and transmits this to the client PC 3 via the PCI bus
interface 21.

The client PC 3 outputs the section data to the monitor 32
via the PCI bus 22 and the VGA controller 31 to display the
homepage desired by the user through the transfer request, on the

screen of the monitor 31.

According to the above configuration, when the provider 6 obtains authentication based on the recognition data supplied from the client PC 3, the satellite Internet system 1 transmits the key ID obtained by converting the MAC address, the software for a receiving board and the download application from the above provider 6 to the client PC 3 as installed data.

The client PC 3 temporarily stores the installed data transmitted from the provider 6 in the main memory 27. When a legal key ID is entered on the input screen of the monitor 32 displayed by starting the download application, the client PC 3 performs data extension on the software for a receiving board read out from the main memory 27, writes in the extended data to a prescribed area of the HDD 26, decodes the key ID read out from the main memory 27 to return the MAC address, and writes this in to another area of the HDD 26 different from the software for a receiving board.

The client PC 3 reads out the software for a receiving board from the HDD 26, transfers the software to the receiving board 7, and writes in a flash memory 19. Then the client PC 3 reads out the MAC address from the HDD 26, transfers the MAC address to the readout receiving board 7, and writes in the flash memory 19. Thereby, the MAC address is unique to the software for a receiving board and the receiving board 7. The MAC address is necessary to start the one-to-one data communication service downloading of the into the flash memory 19 via the provider 6 and

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the communication satellite 9.

In this manner, in the satellite Internet system 1, downloading of software for a receiving board and MAC address is can be executed only when by what the user transmits the recognition data to the provider 6 with the client PC 3 and enters the key ID on the input screen displayed on the monitor 32 based on the installed data supplied from the above provider 6. Therefore, the user can structure a communication condition capable of using a satellite Internet service without knowledge special consciousness of the download processing of the software for a receiving board and the MAC address.

Furthermore, the satellite Internet system 1 allows can make the HDD 26 to separately store both of the software for a receiving board and the download application that are common to all the receiving boards 7, and the unique key ID different for each receiving board 7 to respective storage areas. Thereby, even if the software for a receiving board and the download application are opened to the Internet, leakage of information unique to the user can be prevented because the key ID is never included.

Since the satellite Internet system 1 converts the MAC address into the key ID and transmits this in a state adding the state where redundant data is added, the security of the MAC address unique to the receiving board 7 can be further improved.

In the satellite Internet system 1, even in the case where the MAC address is assigned to the receiving board 7 and then an

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IC card number unique to each IRD is transmitted to the above receiving board 7 and additionally installed, the provider 6 can readily install the IC card number in the flash memory 19 using the software for a receiving board downloaded in the above receiving board 7 by transmitting the IC card number from the client PC 3 to the receiving board 7 based on the MAC address. That is, the satellite Internet system 1 can easily ~~execute~~ update ~~of~~ only unique terminal information such as the MAC address, the IC card or the like in similar manner.

Since the satellite Internet system 1 assigns the MAC address to the receiving board 7 and then notifies the provider 6 of the content of the software written in the flash memory 19 of the above receiving board 7, the satellite Internet system 1 can get the above provider 6 to transmit a new update program to update the flash memory 19 of the receiving board 7 based on the MAC address. Thereby, update of the receiving board can be readily performed.

Furthermore, since the satellite Internet system 1 fixedly assigns the unique MAC addresses to all the receiving boards 7, the client PC 3 can transmit a transfer request of service information to the provider 6 with the MAC address added. Thus, since the provider 6 can use the transmitted MAC address as the receiver's address, management of the MAC addresses assigned to all the receiving boards 7 is unnecessary for the provider 6; reply processing of service information to the transfer request

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becomes easy.

According to the above configuration, when obtaining authentication based on the recognition data from the client PC 3, the satellite Internet system 1 transmits the installed data from the provider 6 to the client PC 3, and installs the MAC address in the flash memory 19 of the receiving board 7 via the above client PC 3, simultaneously ~~and at the same time, it~~ downloads the software for a receiving board to change the processing. Thereby, it can transmit the transfer request to the provider 6 along with the MAC address from the client PC 3. Furthermore, the provider 6 can use the transmitted MAC address as the address of a receiving terminal 2. Thus, a homepage corresponding to the transfer request can be transmitted from the provider 6 via the communication satellite 9 to the receiving terminal 2.

Note that, in the aforementioned embodiment, the recognition data is transmitted from the client PC 3 to the provider 6 so that the client PC 3 makes the provider 6 prepare ~~reply~~ the software for a receiving board and the key ID, and downloads them in the flash memory 19 of the receiving board 7. ~~However, the present invention~~ In addition, ~~is not only limited to this but~~ also it ~~can be as follows:~~ the provider 6 may ~~becomes as a~~ central equipment and transmits the software for a receiving board, the download application and the key ID to the client PC 3 along with a prescribed identifier that corresponds to the receiving board 7 via the communication satellite 9. The ~~and the~~ above client PC 3, receiving the ~~its~~ identifier,

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downloads the software for a receiving board in the receiving board 7 using the download application and downloads the MAC address obtained by returning the key ID in the receiving board 7.

In the aforementioned embodiment, the service information corresponding to the transfer request such as a homepage or the like is transmitted to the client PC 3 via the communication satellite 9. The ~~However, the present invention is not only limited to this but also the~~ service information can also be transmitted to the client PC 3 using the Internet 5 and the terrestrial circuit 4. Also in this case, the similar effects to the aforementioned embodiment can be obtained.

In the aforementioned embodiment, section data in a section format is generated by collecting plural TS packets through the demultiplexer 17 and the data processor 20 of the receiving board 7. This data ~~and this~~ is transmitted to the client PC 3 via the PCI bus interface 21, to display the picture of the homepage on the monitor 32. The ~~However, the present invention is not only limited to this but also the~~ data processor 20 also can be provided in the IRD 8 to directly display the picture based on the section data obtained via the demultiplexer 14 and the data processor 20 in the IRD 8, on a television screen.

In the aforementioned embodiment, the software for the flash memory 19 in the receiving board 7 is updated based on the software for a receiving board. However, the present invention is not only limited to this but also hardware such as a programmable

logic device (PLD) that can freely change the circuitry of e.g. field programmable gate arrays (FPGA) can be updated.

In the aforementioned embodiment, the MAC address is written by converting the key ID after the software for a receiving board is written in the flash memory 19 of the receiving board 7. ~~However, the present invention is not only limited to this but~~ In addition, ~~also~~ in the case where the software for a receiving board in which the MAC address has been written is transmitted, the software for a receiving board and the MAC address can be integrally written in the flash memory 19 of the receiving board 7 after being subjected to data extension.

In the aforementioned embodiment, the key ID generated by encoding the MAC address is transmitted. also, ~~However, the present invention is not only limited to this but also~~ if there is no danger of falsification by user, it is not always necessary ~~needed~~ to convert the MAC address into the key ID. Moreover, in converting, provided that a receiving board 7 can have unique information, the MAC address can be converted into unique terminal information other than key ID and used.

While there has been described in connection with the preferred embodiments of the invention, it will be obvious to those skilled in the art that various changes and modifications may be aimed, therefore, to cover in the appended claims all such changes and modifications as fall within the true spirit and scope of the invention.